

# **PROGRESS REPORT**

**GRANT NUMBER: 7310071**

**Grant Title**

**Grantee**

**10/1/2014 – 12/31/2014**

**Arctic Field Testing and Power Curve Verification of the  
Eocycle 25/12 Wind Turbine**

**Deliverables Submitted this reporting period**

Unit commissioned and Data monitoring

**Budget**

Amount Invoiced: \$ 273,950.29 so far out of the total budget.

Grant balance \$ 74,349.71

**Schedule Status**

Very delayed,,

Turbine have arrived in Kotzebue 9/29/2013.

Moved to KEA pad for assembly 10/2/2013.

Pad installation 10/8/2013.

Eocycle personal at site for commissioning by the 28<sup>th</sup> October- 15<sup>th</sup> November

Anticipated repair/and adjustment date 7/15/2014

-KEA recd and installed ladder and platform on Eocycle tower

-KEA changed out ultrasonic wind sensor.

-KEA replenished hydraulic brake reservoir.

-Eocycle running on Sep 18 2014

-Overspeed condition detected on Saturday September 20<sup>th</sup>.-Blade tied off to tower on Sunday Sep. 21<sup>st</sup>.-Eocycle personal in Kotzebue for repair of drive and clutch 6<sup>th</sup> -17<sup>th</sup> October.

-Repair and commissioning complete

**Percent Complete**

Tasks/Milestones	Start Date	End Date	Percent Complete
1. Foundation and electrical design	3/1/13	8/20/13	100%
2. Procurement and delivery	3/1/13	9/29/13	100%
3. Foundation work BBFM	7/1/13	10/2/13	100%
4. Install electrical and SCADA	8/1/13	11/15/13	100%
5. Move and update MET tower	6/1/13	7/15/2014	90%
6. Installation and commissioning	10/23/13	8/1/14	100%
7. Operation and monitoring	11/1/13	7/31/15	20%
8. Data analysis and draft project report	3/1/13	7/31/15	5%
9. Final project report		8/15/15	0

**Work Progress**

Work that was performed in this reporting period:

- **Milestone 5 :**
- -MET Tower relocated.
- Re-Instrumentation ongoing.
  
- **Milestone 6**
- -Eocycle unable to successfully upload data file to website. KEA investigating comms issue.
- April 7<sup>th</sup> Issue with Brake assembly shuts down unit,
- Tower latter and platform ordered, anticipating arrival in Kotzebue 2<sup>nd</sup> week August.
- Repair of brake assembly, scheduled for mid July.
- -KEA recd and installed ladder and platform on Eocycle tower
- -KEA changed out ultrasonic wind sensor.
- -KEA replenished hydraulic brake reservoir.
- -Eocycle running on Sep. 18 2014
- -Overspeed condition detected on Saturday September 20<sup>th</sup>.
- -Blade tied off to tower on Sunday Sep. 21<sup>st</sup>.
- -Eocycle personal in Kotzebue for repair of drive and clutch 6<sup>th</sup> -17<sup>th</sup> October.
- Estimated repair completion time 17<sup>th</sup> October.
- Repair completed and Turbine online.

### **Additional**

The problem with the brake assembly slowed down commissioning, due to not being able to go up and manually overlook the inside of the unit during operation.

It was decided that a latter and platform would be needed to adequately address issues in the future. Platform and Latter was ordered and have been installed.

### **Note from Eocycle**

Status:

- The system has been inspected for turbine mechanical integrity and have changed some of the parts from the coupling including brake pads.
- The converter has been replaced including cabling and HMI (Human machine interface) module.
- Some wiring changes have been implemented to make the system more robust in the future.
  
- A computer has been left on site with fiber optics cable tie to the converter. This will help for online monitoring of the converter during operation. This temporary measurements will help look into the converter parameters in detail during operation.

Close monitoring of the system during this new start up and the implementation of some of the improvements will require a robust internet connection.

### **Future Work**

Work anticipated for the next reporting period:

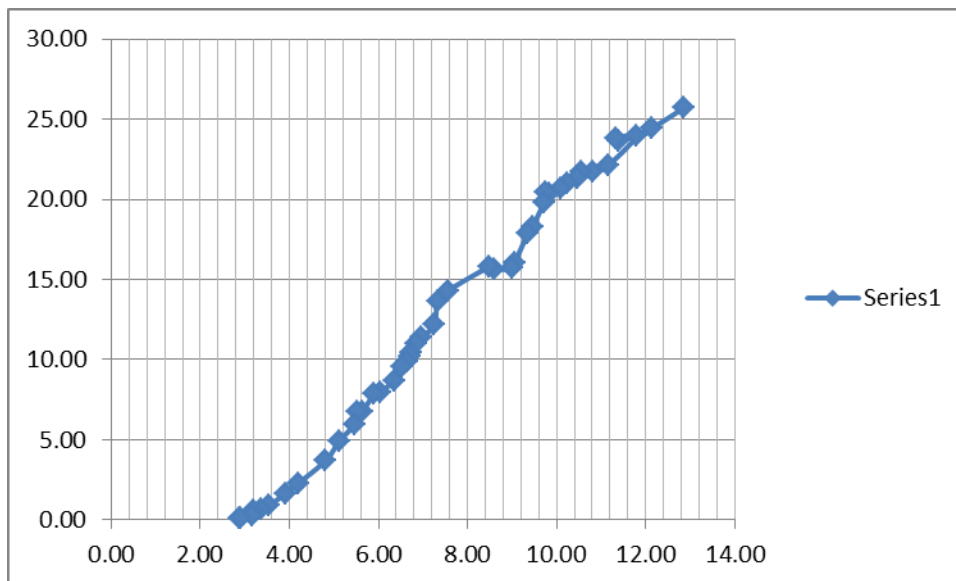
- Complete Met tower refurbishment.
- Data collection

### **Possible negative impacts:**

- Weather

### **Data collection and analysis:**

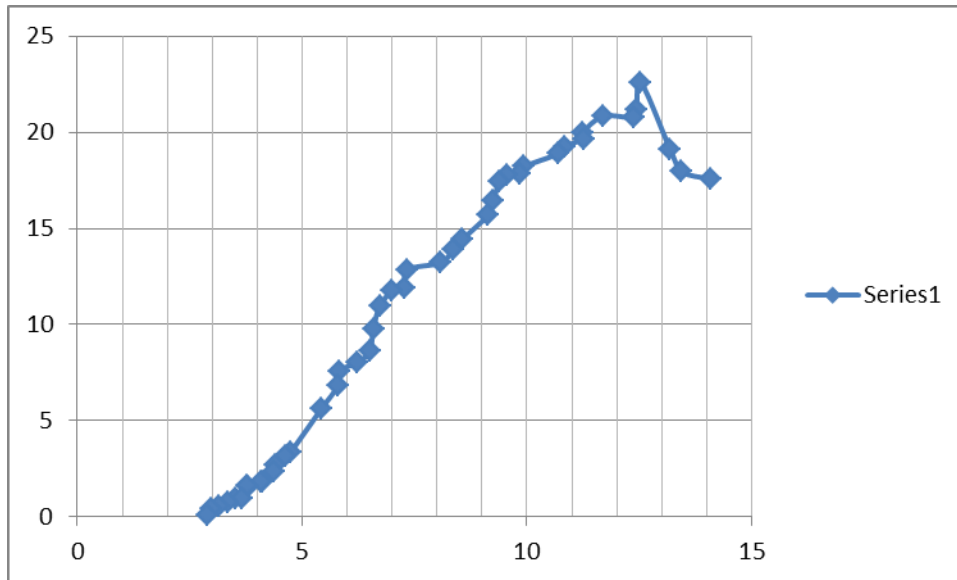
**DATA** scatter plot from November 2014. Air density 1.3136 Kg/m<sup>3</sup>



Total energy accumulated for November was 59,126 Kwh

The turbine was getting “tuned in” by the engineers at Eocycle during November. Initially it was not allowed to go to full power.

**DATA** scatter plot from December 2014. Air density 1.3045 Kg/m<sup>3</sup>



Total energy accumulated for December was 34,848 Kwh

During December the fine tuning of the turbine continued and a significant icing event also took place with recovery after ice had sublimated from the blades.  
The turbine performed well during this time of recovery.

Complete data sets for November and December have been provided separate from this report.

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